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ABSTRACT

This study focused on the test and cross-cultural validation of an organizational and behavioral model of planned change. The aim of the research was to ascertain the nature and direction of different cultural aspects influencing the change process when Information and Communication Technology (ICT) was being implemented in schools. The theoretical basis was the "A-Victory Model" (Foundation for Young Australians and C. Sharp, 2000), which guided and informed data collection in England and South Korea. The focus of the quantitative measures was to assess the intensity and direction of aspects at the school and classroom level concerning the use of ICT processes framed by a national strategy. Questionnaires were sent to 1,000 teachers in England and 1,000 teachers in Korea. Response rates were 31.7% in England and 39.3% in Korea. Eight elements in the model, including ability, value, information, circumstance, yield (in terms of outcomes), resistance, motivation, and timing were used to measure change. Twelve types of background data were collected to illuminate group differences. Data analyses revealed the different propensities for change in the use of ICT between the two countries for age, career, education, equipment, and performance group comparisons, but there was no evidence of differences in sex, subject, area and school size, skill, and training groups between the two countries. Two elements were identified as barriers to change in both countries: ability and yield in Korea and motivation and yield in England. The most important factor in teachers' behavioral and school organizational change was "information" that is necessary for teachers' likelihood of change in the use of ICT for teachers' professional practice. One appendix contains the survey instrument, and the other is the category variable investigation form. (Contains 34 references.) (Author/SLD)

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Validating Behavioural Change : Teachers' Perception and Use of ICT in England and Korea

DECEMBER 2001

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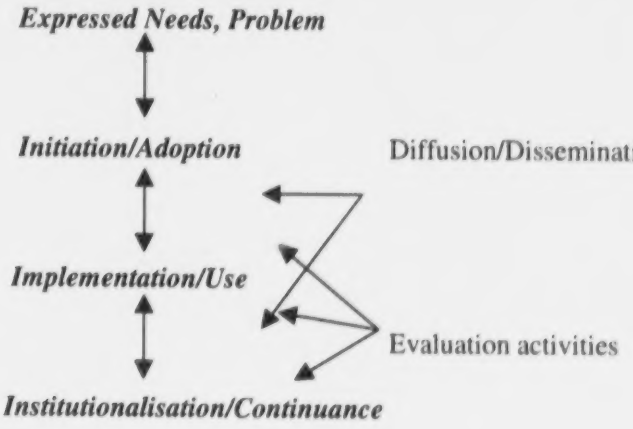
ABSTRACT

The study focuses on the further test and Cross-cultural validation of an organisational and behavioural model of planned change. The aim of the research is to ascertain the nature and direction of different cultural aspects influencing on the change process when implementing Information and Communication Technology (ICT) at schools. The theoretical basis for effecting this was the 'A-Victory Model'. This guided and informed data collection in two countries : England and South Korea. The focus of the quantitative measures were to assess the intensity and direction of aspects at the school and classroom level concerning the use of ICT process under framed by a national strategy. Eight elements in the model including ability, value, information, circumstance, yield, resist, motivation and timing were used to measure the change. Twelve background data were collected to illuminate the group differences within the groups and these outcomes were compared between two countries. Data analysis revealed the different propensity of change in the use of ICT between two countries in age, career, education, equipment and performance group comparisons but there was no evidence of differences in sex, subject, area and school size, skill and training groups between two countries. Two elements were identified as barriers to change in both countries ; ability and yield in Korea, and motivation and yield in England. The most important factor in the teachers' behavioural and school organisational change was 'information' that is necessary for teachers' likelihood of change in the use of ICT for teachers' professional practice.

INTRODUCTION

Curriculum scholars generally recognise four basic phases in the process of educational change (Marsh1986) ; Orientation/needs---Initiation/adoption phases---Implementation /Initial use of phase---Institutionalisation/Continuation phase(see Figure 1). Attempts for official initiations are made in implementation stage after the needs and first adoption stages.

Figure 1. Educational Change Process(Marsh 1986 : 103)



Structures and patterns of teachers' behavioural change are established in the 'Institutional /Continuance phase' in Figure 1 so that the use of innovation is maintained through administrative commitment, pressures and support. Although these four phases seem to be separated for purposes of analysis, in practice they will merge imperceptively into each other. There can be forward and backward modifications between the phases, and the time periods for each phase can vary tremendously (Marsh 1986 : 103-104).

Scott and Meyer (1991:365) confirm that organisations in American education operating in aggressive technical and strong institutional environments experience high level of

conflict. The conflict is reflected in a lack of consensus regarding appropriate institutional arrangements for schooling. Such conflicts are clearly on the rise. According to these authors, such conflict has lead researchers to study issues of organisational survival and institutional legitimacy in environments that demand efficiency. This empirical study aims to provide information on the propensity of teachers' behavioural change in related to recent implementation of enforced change in the technical environmental within which schools operate. The views among institutionalist researchers on school organisation change that teachers' change in the course of the technological development is necessary to argue organisational stability and legitimacy in terms of norms and values. It is also possible that teachers' behavioural change enables institutional legitimacy and conformity to evolve gradually. The significance of present study lies in its focus on

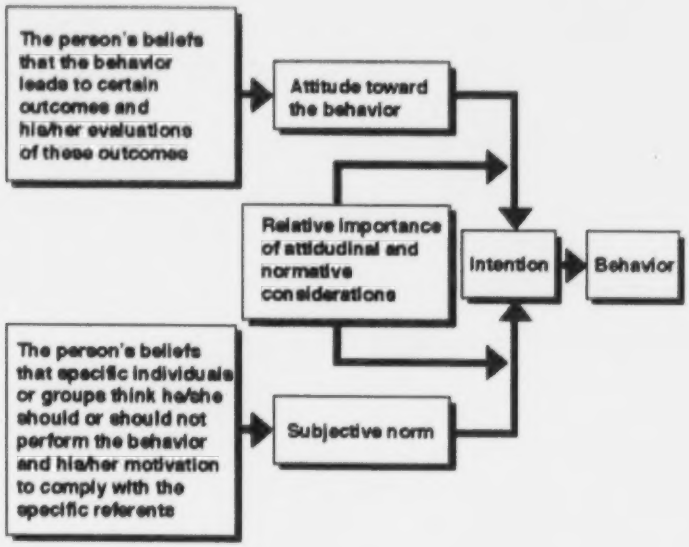
a) Prediction of teachers' behavioural change in relation to use of ICT in the classroom,
b) Identification of the barriers such change, and,
c) Identification of the most important factors for such change during the process of implementation of the ICT in education.

MODELS FOR SCHOOL ORGANISATION AND BEHAVUOIRAL CHANGE

Within the cognitive orientation, school organisation is characterised as teachers' aggregated identities. At the level of the individual, Fishbein and Ajzen(1975:22) assert that several investigators have used principles taken from the learning theories of Hull (1943,1951), Spence (1956) and Tolman (1932) to study the acquisition of beliefs and attitudes among teachers. Generally, such behavioural studies derived from learning

theories are concerned with the processes whereby a given response becomes associated with (or conditioned) a given stimulus.

Figure 2. Schematic Presentation of Conceptual Framework for the Prediction of Behaviour


The person's beliefs that the behavior leads to certain outcomes and his/her evaluations of these outcomes
Attitude toward the behavior
Relative importance of attidudinal and normative considerations
Intention
Behavior
The person's beliefs that specific individuals or groups think he/she should or should not perform the behavior and his/her motivation to comply with the specific referents
Subjective norm

Source : Adopted by Denison,J(1996), Fishbein *et al.*(1994)

Fishbein and Ajzen(1975 :53) named the scheme in (Figure2) as a reasoned action theory. An individual's behavioural intention is the most immediate factor influencing his/her behaviour. This intention is a function of the individual's attitude and subjective norm. The individual's attitude and subjective norm are both considered a function of the weighted sum of the appropriate beliefs (Ajzen and Fishbein, 1980; Severin and Tankard, 2001). This model has been developed further to predict planned human behaviour (Theory of Planned Behaviour : TPB) by adopting 'the perceived behavioural control' concept. But this model has limitations due to its individualistic approach that there is no

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consideration of the role of environmental and structural issue of the behavioural change and the theory components are too linear (Kippax and Crawford 1993). Brown (1999) argues that the model has the following limitations and that this confines the model's applicability.

- Factors such as personality and demographic variables are not taken into consideration.
- The assumption is made that perceived behavioural control predicts actual behavioural control. This may not always be the case.
- TPB only works when some aspect of the behaviour is not under volitional control.
- The longer the time interval between behavioural intent and action, the less likely it is that the behaviour will occur.

But the theory provides a strong clue in understanding human behaviour occurrence to intermediate the model used in this study on organisational and behavioural change model.

FYA & Sharp (2000) argues that efficiency, effectiveness and appropriateness is deeply related with policy evaluation and suggests 'the A-Victory Model' that take after the abbreviations of the checklist elements. This model was originated from NIMH (1971) to assess the likelihood of institutional change and readiness for change, and to evaluate and to predict the barriers in implementing innovations. The model's eight elements were regarded as important representatives within a given institution that aims to forward for the future with innovations. Each element was decided through last decades' human and

sociology studies and the necessity of the element adoption is rationalised by the following manners.

Ability: Are available staff sufficiently skilled to manage and evaluate the project?

Values: Have you identified community needs and values which are likely to affect participation of stakeholders in the project Steering Committee?

Information: Have you gathered useful information to make a good case for the continuation of the project, and to monitor the progress of the project?

Circumstances: What are the main political, social, economic and cultural factors and how might they affect the implementation of the project?

Timing : How is the timing of the project affected by these circumstances? What are the critical steps and by when do they have to be completed?

Obligation: To whom is the project accountable?

Resistance: Who or what might be against the project or create unfavourable circumstances?

Yield: What are the expected outcomes and longer-term costs and benefits? (FYT and Sharp 2000 : 6)

In the present study this checklist was developed into a questionnaire (see Appendix1) for the use in a survey between England and the Republic of Korea. The questionnaire is designed to survey teachers' perception of their change in the use of ICT within their professional practice. Various quantitative experimented by NIMH(1971) and Kiresuk (1994) for scale development and model elements testing. NIMH(1971) suggests that the A-Victory elements can be used as a checklist in the form of the following equation :

Desired Behavioural Change = Value + Timing + Circumstance + (Information + Yield) x (Motivation x Ability) – Resist----------(Equation 1).

Zaltman (2000, Email discussion, Harvard University, G.zaltman@harvard.edu) elaborated this as follows. :

...the terms motivation and ability are multiplied is that they are interactive with one another. Ability ultimately influences motivation and motivation ultimately can influence the acquisition of Ability. At least that is our experience...(5.Sep.2000).

The other fundamental element of human behaviour is value (including belief and attitude) whilst the variables of timing, circumstance and resist are considered to be situational and environmental in origin. The checklist and equation 1 were designed and used to measure the likelihood of organisational and behavioural change in the context of teachers' use of ICT in classroom practice. The present study three aims to ; assess the intensity and direction of real change ; ascertain cross-cultural comparison on the nature and differences between the two selected countries (England and Republic of Korea) at the school and classroom level concerning the use of ICT within national strategy for education. These aims are encapsulated in the research questions and null-hypotheses delineated in the following section. 'The National Grid for Learning' (DfEE 2000) in England and 'Six-Year Plan for ICT' in the Republic of Korea (MoE 2000) were regarded as major national strategies forming a context for the study.

RESEARCH QUESTION AND HYPOTHESIS

Q1. Does the A-Victory model enable differences to be identified in the ICT-directed change of schools, or groups of schools and if so can it enable direction and intensity of any change to be predicted? (Note: Category variables are country, gender, age, experience, skill, training, region, education, teaching subjects, ICT equipment, pupil's performance and school size)

(Sub Q1). Is the energy (intensity) measured by the model for school systems the same between the two countries and among the category variables?

(Sub Q2). Does the direction of energy (change) vary in each country?

Q2. What are the perceived barriers to effecting desired change in teachers and schools in implementing educational ICT?

Q3. Can the model predict patterns of change that are induced by real and apparent innovations in ICT in schools and classrooms? (Note : real change means a measure from questionnaire number 11, and apparent change means a measure derived from the equation of the A-Victory model. This question is framed to elicit the perceived level of real and apparent change, and to gauge the prediction of the relationship between the variables to identify which elements are related to real change.

The five research questions were established to test the model and to explain the different cultural impact on the propensity of school organisation and behavioural change.

Q1 suggests the null hypothesis test using equation 1 designated by NIMH and compared the data within the category variables.

Null-hypothesis 1.

Country, $H_0: \eta_{England} = \eta_{Korea}$

Sex , $H_0: \eta_{man} = \eta_{woman}$

Age, $H_0: \eta_{18\text{-}30} = \eta_{31\text{-}45} = \eta_{45+}$

Career, $H_0: \eta_{1\text{-}9} = \eta_{10+}$

Education, $H_0: \eta_{BA} = \eta_{MA}$

Subject, $H_0: \eta_{Math} = \eta_{Language} = \eta_{Humanity} = \eta_{Science} = \eta_{Art} = \eta_{Technology} = \eta_{sociology} = \eta_{others}$

Skill, $H_0: \eta_{nonuser} = \eta_{novice} = \eta_{some\ experience} = \eta_{very\ experience}$

Training, $H_0: \eta_{trained} = \eta_{untrained}$

Equipment, $H_0: \eta_{good} = \eta_{average} = \eta_{poor}$

Performance, H_0 $\eta_{good} = \eta_{poor}$

Size, H_0 $\eta_{big} = \eta_{small}$

Area, H_0 $\eta_{village} = \eta_{town} = \eta_{city}$

Null-hypothesis 2.

Intensity, H_0 : $\eta_{ability} = \eta_{value} = \eta_{Information} = \eta_{Circumstance} = \eta_{Timing} = \eta_{Motivation} = \eta_{Resist} = \eta_{Yield} \leq 2.5$.

Q2 is aiming to identify and illuminate the barriers to change. The mean score of element is under 2.5 is regarded as perceived barriers to change in this model.

Q3 aims to explain the relationships between real change and apparent change, and the important predictors of the real change among the model elements.

Null Hypothesis 1: Apparent change has no relationship with real change.

In the equation $Y_{\text{expected real change}} = \alpha + \beta_{\text{apparent change}} X_1 + e$,

H0 : $\beta_{\text{apparent change}} = 0$

Null Hypothesis 2: Model elements have no relationship with the real change.

In the equation $Y_{\text{expected real change}} = \alpha + \beta_{1(\text{ability})} X_1 + \beta_{2(\text{value})} X_2 + \beta_{3(\text{information})} X_3 + \beta_{4(\text{circumstance})} X_4 + \beta_{5(\text{timing})} X_5 + \beta_{6(\text{obligation})} X_6 + \beta_{7(\text{resist})} X_7 + \beta_{8(\text{yield})} X_8 + e$,

H0 : $\beta_{1(\text{ability})} = \beta_{2(\text{value})} = \beta_{3(\text{information})} = \beta_{4(\text{circumstance})} = \beta_{5(\text{timing})} = \beta_{6(\text{obligation})} = \beta_{7(\text{resist})} = \beta_{8(\text{yield})} = 0$

THEORETICAL CONSIDERATIONS FOR SCALE CONSTRUCTION

Several techniques adopted in using the A-Victory Model in the research. Thurstone type eleven scales as developed by Kiresuk(1994) were used.

Figure 3. A VICTORY SCALE

Not at all										Best Possible
0	1	2	3	4	5	6	7	8	9	10

But A-Victory model's checklist is hard to say that it has a operationalised and formalised continuum that following the principle of Thurstone scales(Andrich : 1990, in : Walberg and Haertel : 1990 : 329). Guttman scales are differ from Likert scales in the two points that ; first, the statement included on such scales represent increasingly positive feeling with respect to the attitude object. Second, the endorsement of any statement implies the endorsement of each less positive statement (Anderson : 1990 : 333).

Likert scales tend to consist of a series of statements related, for example, to a person's attitude toward a single object or entity with bi-polar opposites aligned to positive or favourable attitude and negative or unfavourable attitude. Typical response options are agree : disagree. A numerical value is assigned to each response option and the numerical values are summed to produce a total score (summated scales). Anderson (1990 : 334) considers that the advantage of the Likert scales include ease of construction compared to Thurstone and Guttman scales; adaptability to a wide variety of attitude objects, situations, and settings ; and ability to assess both the direction and intensity of attitude. The major disadvantage is that different response patterns can produce the same total score. The insensitivity of the Likert scale compared to the Thurstone and Guttman

scales, is a limitation in this study, but it is nevertheless an appropriate tool for conducting a wide area survey involving a summating procedure to assigned values and in ascertaining the direction and intensity of the likelihood of teachers' change.

PROCEDURE OF THE SURVEY AND ANALYSIS

Samples were selected within the same geographical region (Southwest) at state secondary school in two countries. Pilot test were undertaken during December 2000 in England and Republic of Korea through 50 teachers each country (Leeh *et al.* 2001:105-133). Modification of the questionnaire was made after the pilot test to improve further the rate of response and item reliability. 1,000 questionnaire packs were sent to each country in January 2001 and the survey was finished in June 2001. The designated minimum expected rate of return was 33% to satisfy the 95% precision level and $P < 0.01$ significance level. The response rate of each country is 31.7% from England and 39.3% from Korea. Before the main analysis two tests were undertaken. For the item reliability test, the Cronbach alpha test revealed the acceptable coefficient level from 0.6163 - 0.8294 in Korea and 0.6449 - 0.8389 in England. Through the parametric test, the distributions of the raw data show 89% of non-parametric distribution but this data was used as a parametric data to apply more powerful analysis process. To test the null hypotheses, t-Test and ANOVA and linear regression were adopted to apply more powerful parametric assumptions underlying the techniques. Possible out-liers that can make the distribution non-parametric, were included during the analysis. It was noted however, that when the outliers were eliminated, the mean scores derived from the A-Victory model could not produce any significance differences among comparative data because most scores centred on the mean scores. A single question can lead to bias in the

measurement of the teachers' perceptions and attitudes. The three items in the yield element were modified into a single question after pilot test to eliminate repeated contents and to avoid the multi-dimensional problems in the question items. This improved the overall consistency of the instrument on the one hand and decreased the item reliability on the other hand but this was endured as an optimal choice in this occasion.

RESULTS AND DISCUSSION

Question1-1. The Null hypotheses test revealed that there are common results between the two countries: acceptance of the null hypothesis in sex, subjects, school size and school area(Table 3) ; and rejections of null hypotheses in skill, training group comparisons(Table 4). There were different outcomes between two countries in the variables of country, age, career, education, equipment, pupil's performance group comparison(Table 5).

Question1-2. The Null hypotheses test revealed that among the 272 groups scale scores data, 23.16% of Korean category groups and 23.16% of English category groups show possible negative directions. Conversely, 76.84% of Korean and 76.84% of English teacher groups in the analysis show positive likelihood of change. In the each element level, ability and yield elements show non-positive direction by 70.59% (24 groups in the 34 groups) and 97.06%(33 groups in the 34 groups) in the Korean data. Motivation and Yield elements show non-positive direction by 50% (17 groups in the 34 groups) and 88.24% (30 groups in the 34 groups) respectively in England.

Question2. From the outcomes of the question1-2, perceived barriers to change are

identified as 'ability' and 'yield' in Korea, and 'motivation' and 'yield' in England.

Question3-1. Apparent change (A-Victory Model score) has a linear relationship with real change in both countries. The null hypotheses were rejected in both countries. Regression analysis shows the evidence significantly ($P \leq 0.0001$) with R^2 =0.091, and β coefficient 0.301 in England. Korea shows stronger relationships between apparent change and real change with R^2(0.242) and beta coefficient of 0.492 than England significantly ($P \leq 0.0001$).

Question3-2. Two elements (Information and Circumstance) have relationships with real change in the model. Here, the information element has a very strong linear relationship with both apparent and real change in both countries. In England, two elements have linear relationships with the real change statistically with R^2 =0.255, and β coefficient 0.394(Information), 0.157(Circumstance) as in the Table 1. The null hypothesis test rejected relationships between the real change and the two model elements. The 'Information' element shows stronger in the significance level ($P \leq 0.0001$) compare to the circumstance element ($P \leq 0.05$). In the Republic of Korea, the same two elements have linear relationships with the real change statistically with R^2 =0.390, and β coefficient 0.422(Information), 0.145(circumstance) as in the Table 2. The null hypothesis test rejected in the relationships between the real change and the two model elements. Information element shows stronger indicator with the significant level ($P \leq 0.0001$) compare to the circumstance element ($P \leq 0.01$) like England. The information element represents information provided by change agents such as subject material for education, information access degree in the schools, necessary information for teachers' implementation in the ICT use etc.

Table 1. Regression Coefficients (England)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.952	.376		2.535	.012
	ABILITY	-4.459E-02	.088	-.030	-.504	.614
	VALUE	1.340E-02	.109	.009	.123	.902
	INFORM	.525	.087	.394	6.027	.000**
	CIRCUM	.258	.117	.157	2.198	.029*
	TIMING	5.579E-02	.094	.037	.593	.554
	MOTI	5.579E-03	.092	.004	.061	.952
	RESIST	-2.918E-02	.066	-.023	-.443	.658
	YIELD	-.118	.068	-.099	-1.741	.083

a Dependent Variable: VALUE11

b. Significant level : ** $P \leq 0.0001$, * $P \leq 0.05$

Table 2. Regression Coefficients (Republic of Korea)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model		B	Std. Error	Beta		
1	(Constant)	.226	.232		.975	.330
	ABILITY	.114	.067	.089	1.694	.091
	VALUE	.100	.075	.072	1.335	.183
	INFORM	.514	.065	.422	7.951	.000**
	CIRCUM	.233	.088	.145	2.643	.009*
	TIMING	3.222E-02	.067	.025	.479	.632
	MOTI	3.810E-02	.069	.028	.554	.580
	RESIST	-1.734E-02	.048	-.015	-.358	.721
	YIELD	-4.367E-02	.045	-.044	-.978	.329

a Dependent Variable: VALUE11

b. Significant level : ** $P \leq 0.0001$, *$P \leq 0.01$.

Theoretically, this model encompasses the double objects for measuring propensity of change ; individual and organisational aspects. Considering that much research regards aggregated individual level lead to organisational matter (Carter and O'Neill 1995 :179; Comstock and Scott 1977; Pallas1988; Rowan et al 1991:203-223; James and Jones 1974; Anderson 1982; Miskel and Ogawa 1988), the model does not confine the area like that because the concurrent measure of individual and organisational aspects were considered in this model. For example question items 3 and 4, reflect organisational matters and question item 12 and 13 related to human behavioural affairs (see Appendix

1).

Another dimension of the theoretical implications of this model is its multidimensional usage such as longitudinal and cross-sectional research. A longitudinal study was undertaken by Kiresuk (1994) and one cross-sectional model test was made by Leeh *et al.*(2001). The diverse application of the model promoted the embedded robustness of the validity of the model and it also revealed the flexibility of the model in social change research.

In relation to the further test of the model and cross-cultural validity, the following discussion in the positivistic dimension can be drawn.

- An analysis of item reliability and criterion-related validity sustained the model's validity.
- A big picture on prediction of organisational structure could be seen through the analysis.

Table 3. The homogeneity category (two countries)

Category	England		Republic of Korea	
	Homogeneity	Heterogeneity	homogeneity	Heterogeneity
Gender	X		X	
Area	X		X	
Subjects	X		X	
Size	X		X	

Among the 11 categories, the four categories in the Table 3 were regarded as homogeneity structure in the measurement. This means that the ICT initiatives could be adopted among the groups indifferently (men and women, rural and urban, across subjects, big school and small school) in their propensity of behavioural change.

Table 4. The heterogeneity category (two countries)

Category	England		Republic of Korea	
	Homogeneity	Heterogeneity	Homogeneity	Heterogeneity
Training		X		X
Skill		X		X

The two categories in the Table 4 clearly show desirable aspects of change. The trained teachers produced more propensity of behavioural change in the use of ICT. More experienced in the use of ICT could produce more propensity of change in the use of ICT. These evidences implicate that in-service training and skill-ownership are strong predictors of more propensity of change.

Table 5. The different outcomes of organisational structure

Category	England		Republic of Korea	
	Homogeneity	Heterogeneity	Homogeneity	Heterogeneity
Age		X	X	
Career		X	X	
Education	X			X
Equipment		X	X	
Performance		X	X	

Table 5 shows the diverse picture of organisational structure in the propensity of change. All the outcomes from the analysis show different characteristics. It is suspected the cultural impact or pattern of government control on the implementation can affect the differences of organisational change structure in age and career categories but it is impossible to identify this from the data. The last three categories (Education, Equipment, Performance) are related to the organisational productivity.

In Korea, more educated teachers suggested greater propensity of change but England it did not. Whereas, in England, well-equipped schoolteachers show greater propensity of change and the schools with teachers showing greater propensity of change could show greater pupils' attainment, but Korea this is not the case. This evidence shows that propensity of change is inter-wined with efficiency differently in the two countries but the reasons were not identified from the outcomes. Although there are lots of contradictory arguments on relationships between organisation's institutionalisation and efficiency, if we look at within the perspectives such as Williamson (1975; 1985) and Murphy and Louis (1999 : 364), institutionalised rules and norms are enhancing organisational performance. In this regard, the examination of organisation's structural change has significant implications in this change study.

- In relation to the predictability of the change, the model shows a high validity in the generalisation of the regression outcomes internationally. The relationships between real change and apparent change, real change and model elements regression were preceded clearly produced the similar result in both two countries. The strongest element for the prediction of the change in the regression study proved that 'information' element is a first priority for the real (substantial) change for evolving teachers' professional practice.

- The perceived barriers to change were identified between the two countries. Common factor was a yield, i.e., related to the teachers' reward system. Different factors were identified as ability of the use of ICT in Korea and motivation in England. The model

could not explain the reasons for the different outcomes but our suggestion is the different style of education authorities' control in each country.

The A-Victory model was used to ascertain generalised propensity of school organisation's structural change but it has limitations in explaining 'why the organisation structural change is different each other?', 'why the barriers to change is different each other?', 'what is the components of the first priority of the change, i.e., Information?' between the two countries. This implies that further work is required to elicit teachers' perceptions for the raised questions in order to illustrate more and to provide general statements not only validating the model but also understand the deep seated meaning of the education change under the ICT national strategy.

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APPEXDIX1) Instrument

Element	*Questionnaire items*
Ability	1. My ICT skill is appropriate to accommodate my classroom practice. 2. My ICT knowledge is appropriate to accommodate my classroom practice. 3. Current financial resources (running costs) in my school are adequate for using ICT to support the curriculum. *4.* My school has enough computers and network facilities to fulfil the needs of the curriculum.
Values	5. Current educational ICT innovations in my school are consistent with the way I like to organise classroom. 6. Current educational ICT innovations in my school contribute to equality of access to education for my pupils. 7. Current practices of educational ICT innovations in my school are consistent with the DfEE's policies. 8. Current educational ICT innovations in my school are useful for my classroom teaching. 9. Current educational ICT innovations in my school are valuable in promoting children's learning. 10. The head teacher in my school is actively engaged in promoting ICT. 11. My professional practice is increasingly dependent on ICT innovation and use.
Information	12. I can easily access information about ICT innovations that are being used in education. 13. I can easily understand the information about ICT innovations that are being used in education. 14. The information that I have available to me about ICT innovations influences me to improve my Classroom practice. 15. The information that I have available to me about ICT innovations is useful in my situation.
Circumstances	16. There are new patterns of teaching and learning, related to ICT use and innovation, that are of direct advantage to my school. 17. Teaching methods are changing because of ICT innovations in my school. 18. The educational use of ICT innovation is necessary in my school to maintain our current educational standards. 19. Current ICT planning is conducive to the adoption of innovations in teaching and learning in my school.
Timing	20. Now is a good time to use ICT in my school to get on to the Internet for educational purposes. 21. This is a good time to use ICT in my school extensively to meet the current social and employment needs of students (Social and employment needs : school leavers can use computer, Internet and e-mail effectively in their situation). *22.* This is a good time to use ICT in my school extensively in relation to other events (e.g., teacher training, web based educational material services, etc.,) occurring or about to occur in my school.
Obligations	23. The ICT innovations in my school probably have been evaluated soundly by external authorities (LEA or DfEE). 24. It is probable that the current ICT innovations in my school have been compared with other alternatives of ICT educational innovations by external authorities (LEA or DfEE). 25. The current ICT innovations in my school are a good stimulus for teachers to be innovative in their classroom practices.
Resistances	26. There are ICT innovations that I have decided not to adopt for personal reasons. 27. At times I have considered that I have lost out rather than benefited, professionally from the adoption and use of educational ICT innovations. 28. At times I have considered the case for abandoning a particular ICT innovation following its initial adoption by the school.
Yield	29. It is probable that authorities have carefully assessed the benefits of ICT innovations (authorities: DfEE, LEA).

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(APPENDIX2). Category variable investigation form

1. Gender: Female____ Male____

2. Age: 18-22___ 23-30___ 31-45___ 45+ ___

3. Teacher experience: Less than one year___ 1-4 years___ 5-9years___ 10+years___

4. Phase taught: Secondary (range of pupils' age) _____

5. Is your school situated in a village____ small town ____ large town or city ____?

6. Your education is : Bachelors degree_____ Masters degree_____ Doctors degree_____
Certificate/Diploma____ Others (please specify)_____

7. What are your current teaching subjects in your school?
First area (Major) _____
Second area (if applicable) _____

8. In your use of ICT (Information and Communication Technology : see bellow), do you consider yourself to be a:
Non-user____ Novice____ User-some experience____ Very experienced user_____

9. Since 1995, have you received formal training in ICT (workshop, courses)?
Yes_____ No_____

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